

(19)



Europäisches Patentamt  
European Patent Office  
Office européen des brevets

(11) Publication number:

**0 104 072  
A2**

(12)

## EUROPEAN PATENT APPLICATION

(21) Application number: 83305471.1

(51) Int. Cl.<sup>2</sup>: E 05 B 47/00

(22) Date of filing: 19.09.83

(30) Priority: 21.09.82 DE 3234859

(43) Date of publication of application:  
28.03.84 Bulletin 84/13

(84) Designated Contracting States:  
AT BE CH DE FR GB IT LI LU NL SE

(71) Applicant: COLT INTERNATIONAL HOLDINGS A.G.  
Baarerstrasse 59  
CH-6300 Zug(CH)

(84) Designated Contracting States:  
BE CH DE FR IT LI LU NL SE AT

(71) Applicant: COLT INTERNATIONAL LIMITED  
New Lane  
Havant Hampshire PO9 2LY(GB)

(84) Designated Contracting States:  
GB

(72) Inventor: Luther, Klaus  
Beginneck  
D-4194 Schneppenbaum(DE)

(74) Representative: Hughes, Brian Patrick et al.  
Graham Watt & Co. Riverhead  
Sevenoaks, Kent TN13 2BN(GB)

(54) Key security store.

(57) For key depots as regular central and easily accessible key custody means, with the object of a simple handling which is also secure against misuse, it is provided that the key can be removed by the proper authorized user after input of a code signal which is stored internally in an electrical part of the key depot, and this storage cannot be called up from the outside (without destruction) or is unalterable.

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"KEY SECURITY STORE"

The invention relates to a key security store.

Such a key security store can be seen from  
5 the DE-OS 29 02 193 in connection with a security  
lock. It is understood, however, that the terms "key"  
and "lock" are not restricted to special formations  
but are to be understood in the widest sense and  
include even modern substitute forms such as magnetic  
10 cards or other non-mechanical keys and locks fitting  
them.

Key stores should keep keys ready for use  
in an ordered and controllable manner. Keys for  
regular users may be needed as well as those which  
15 serve for special purposes such as master keys for  
fire brigades, police etc. Thus an extensive  
distribution of keys can be avoided and a continuous  
monitoring of the keys can be arranged.

In the case of a key store which is more or  
20 less easily accessible, the possibility of removal by  
unauthorized persons must be reliably guarded against.  
Accordingly, it is an object of the invention to  
provide a key depot which gives security against  
unauthorized removal of keys.

25 The present invention is a key security store

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for at least one key which is kept in a fitting lock and can be taken out of the lock only in response to a special electrical release signal, the key store comprising an input device for a code signal and an  
5 electrical code evaluator in which the code signal is stored internally and after first being used is inaccessible from outside and unalterable and which delivers the release signal after comparison of the code signal fed in with the one stored.

10 A code signal with a suitable input device such as a digital keyboard, provides convenient and reliable handling possibilities which are available to those who know the code. The code should not be accessible by technical means from the outside or be  
15 noted in manufacturer's documents, user lists or the like, otherwise the protection of the code is not ensured and cannot be monitored adequately and protected against passing on. The best possible protection against unauthorized removal thus appears  
20 to be provided if the code signal is only stored in the key depot and in the memory of the authorized user and otherwise remains inaccessible from the outside and unalterable after a first use has taken place.

The code signal is preferably produced by  
25 the switching on of a random generator, which cannot be

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influenced, in the key depot on the first use but it may be determined in another non-decodable manner, in the device or be fed in by the authorized person on the first use.

5           In any case, an output device, for example in the form of a visual display and/or a printing mechanism, may appropriately be provided in order to make the code signal recognisable on the first use. Since a later output of the code signal is out of the  
10 question, it is up to the user alone to keep the code signal secret.

On the first use, use may appropriately be made of an electrical key monitoring means which delivers a reliable identification and presence signal  
15 on the first insertion and enclosure of a security key in a suitable lock. The first appearance of this signal then releases the storage and/or output of the code signal. It is understood that a first use can also be effected in that a key already previously kept  
20 in the lock is removed for the first time or that a first-use signal is fed into the code evaluation in any other manner, for example, through a special key.

The electrical presence signal can further be used to record all key removals if the key store is  
25 equipped with a suitable recording device. In addition,

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it is of interest to record code inputs and signal outputs in order to be able to reconstruct all important operations in the key store if necessary.

As a security against attempts at manipulation, it may appropriately be provided that inputs of wrong codes set off alarms, either with an open alarm which is also perceived by the person causing it or with a silent alarm, for example via a monitoring line to the police, to a monitoring institute or to other persons responsible for the case of alarm. A separate alarm signal may appropriately be provided as an emergency signal in the case where the authorized person is forced to obtain the key. For this case, an emergency code signal may appropriately be provided which, in order to facilitate identification for example, is derived from the code signal, e.g. as a reversal of the sequence of a digital code signal. Also other permutations of a digital sequence or the replacement of individual digits by special emergency signal digits may be suitable to provide an emergency signal which is constantly present. The code evaluation can be adapted to this for monitoring by means familiar to the expert. The emergency signal is then generally only passed on, as a hidden signal, to receivers provided for the purpose.

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An embodiment of the present invention will now be described, by way of example, with reference to the accompanying drawing, the single figure of which is a flow diagram for the commissioning and the regular  
5 use of a key security store.

The key store according to the embodiment is to be understood from the structural point of view as a wall cabinet or wall safe with a service panel in which a plurality (N) of lock cylinders for security  
10 keys are countersunk as far as their end face as when installed in doors. Below the lock cylinders arranged in a raster field, the service panel comprises an input device with a digital keyboard and disposed further up is an output device with an electronical digital display  
15 on a digital printing mechanism.

The lock cylinders are such as are also used for doors and with which the insertion and removal of the key is possible in a position usually provided with a vertical insertion slot which is hereinafter called  
20 the "removal position" while another position turned through  $90^{\circ}$  does not permit any removal of the inserted and turned key and will be designated as the "locking position".

Acting on each of the lock cylinders is an  
25 electromagnetically actuated key bolt so that the lock

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cylinder with the key can only be turned back out of the locking position into the removal position when the key-bolt sets this movement free.

Each lock cylinder is further equipped with  
5 a key monitoring means which here consists, in a particularly simple manner, of an electric contact which closes on the changeover of the lock cylinder from the removal position to the locking position. This leads to a position monitoring for the lock  
10 cylinder which, with the reliable mechanical identification of the key by the lock cylinder, ultimately also represents a key monitoring means.

The parts described above are connected to an electrical code evaluation which is in a position to  
15 check a code signal coming in from the input device and to give out a release signal to the electromagnetic key-bolt of the lock cylinder in question. In the course of this, the key monitoring means delivers additional signals, the evaluation of which will be  
20 returned to later.

The taking into use, particularly the first use, is of particular importance for the security of the key depot. With this, the code signal is fixed and from then on remains stored inaccessible and  
25 unalterable. In order to secure against unauthorized

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access to the electrical part of the key depot, this is not only disposed in a closed and bricked up portion of the depot, but also reinforcements are provided as for safes, the walls being secured by additional electrical burglary monitoring means.

In order to commission the store (after assembly and installation) a start signal (see flow diagram) is fed in which may be effected via the digital keyboard and then leads to a system message to indicate readiness for operation. Then a further input may be made to generate the system, after which the determination of the code signals is effected.

Here an initial condition for the first use is that all the keys are taken out. If a key is now inserted by its owner in the associated lock cylinder and turned from the removal position into the locking position, then a report signal for the key placing goes to the code evaluation. This has a code generator with a random control which does not need to concern all the digits of the code but nevertheless contains so many freedoms of choice that the random chance of an unauthorized third party hitting on the code signal by experiment is extremely small. The code signal thus produced by the code generator is conveyed to the output device where it is indicated and printed out so that the



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user receives a data card with which he can impress the code reliably on his mind at the beginning. At the same time, the code is also stored in the code evaluation. After that, the code signal is cleared  
5 both in the code generator and in the output device so as to exclude any unauthorized access.

It is understood that during use, only one key code at a time, that is to say one code signal for the particular key inserted for the first time is given  
10 out. The operation is repeated as soon as another key is inserted and turned for the first time.

The removal of the key fixed in the locking position is only possible on input of the code signal via the input device. The electrical code evaluation  
15 compares the signal fed in with the stored code signal and delivers a release signal to the electromagnetic key-bolt, after which the key can be turned into the release position and removed. After the removal of the key, the key-bolt, which is constructed in the form  
20 of a spring catch, is brought into its locking position so that, when the key is returned, after insertion and turning, the key engages behind the key-bolt and is locked. A non self-locking key-bolt would have to be controlled electrically to return to its locking position  
25 on the key delivery, as soon as the key is turned.

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The code evaluation is effected with simultaneous recording of the operations in a time record, for which purpose these operations are stored with appropriate identification means and the associated  
5 time of day, as noted in the flow diagram under "time record". The time record also records the signals delivered by the electrical key monitoring means so that the use of the key can be reproduced. The recording medium is accessible without intervention in the  
10 screening of the code evaluation.

The time record presupposes a clock or the like timer with which additional security means can also be provided, for example in that at certain times certain keys are all locked against removal, for example if the  
15 use of a key only comes into question at general working hours or only outside working hours, and these working hours are programmed in for a long time in advance in an unalterable manner in order to make manipulation more difficult.

20 In case an incorrect code signal is fed in, an alarm output is provided. Thus if the code evaluation detects a wrong signal input (which in any case is recorded), it sets off an alarm. Furthermore, the output of an emergency signal on the input of an altered  
25 code signal is possible in the case where the authorized

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user of the key is forced to remove the key. In such cases, no general alarm is usually indicated but a very special, secret signal as a "kidnap alarm" at a competent place. The emergency code signal may

5 appropriately consist of a modification or an amplification of the code signal. In the present case, it is provided that the sequence of digits in the code signal is fed in backwards. During the code checking in the evaluation, the checking is first effected

10 independently of direction so that even an input of the code in the backwards direction does not set off any general alarm. A following direction check, however, leads to a "kidnap alarm" in addition to the release of the key in the event of a code fed in backwards.

15 This alarm possibility serves to protect the authorized person who, with sole knowledge of the code, has a particularly responsible position which may also be more dangerous.

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## CLAIMS:

1. A key security store for at least one key which is kept in a fitting lock and can be taken out of the lock only in response to a special electrical release signal, the key store comprising an input device for a code signal and an electrical code evaluator in which the code signal is stored internally and after first being used is inaccessible from outside and unalterable and which delivers the release signal after comparison of the code signal fed in with the one stored.
2. A key store as claimed in claim 1, further comprising an output device with which the code signal is given out when the lock is first used.
3. A key store as claimed in claim 2, in which the output device comprises a visual display.
4. A key store as claimed in claim 2 or claim 3, in which the output device comprises a printing mechanism.
5. A key store as claimed in any of claims 1 to 4, in which the code evaluation is provided with at least one alarm output and sets off an alarm signal after the input of a wrong code signal.
6. A key store as claimed in any preceding claim, in which the code evaluation is provided with

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at least one emergency-signal output and comprises an evaluation for an emergency code signal on the input of which through the input device, both the release signal to the lock and an emergency signal are given  
5 out.

7. A key store as claimed in claim 6, in which the evaluation for an emergency code signal is adapted to an emergency code signal derived from the code signal by a sequence permuted in a preset manner.

10 8. A key store as claimed in any preceding claim, in which the code evaluator is connected to a time monitoring means whereby the release signal is restricted to certain periods of time or the setting off of alarm or emergency signals takes place only outside  
15 such periods of time.

9. A key store as claimed in claim 8, in which the time monitoring means is inaccessible from outside and is preprogrammed for a long time with regard to the periods of time.

20 10. A key store as claimed in any one of claims 1 to 9, in which, associated with the release signal is a release time after which the release signal is cancelled.

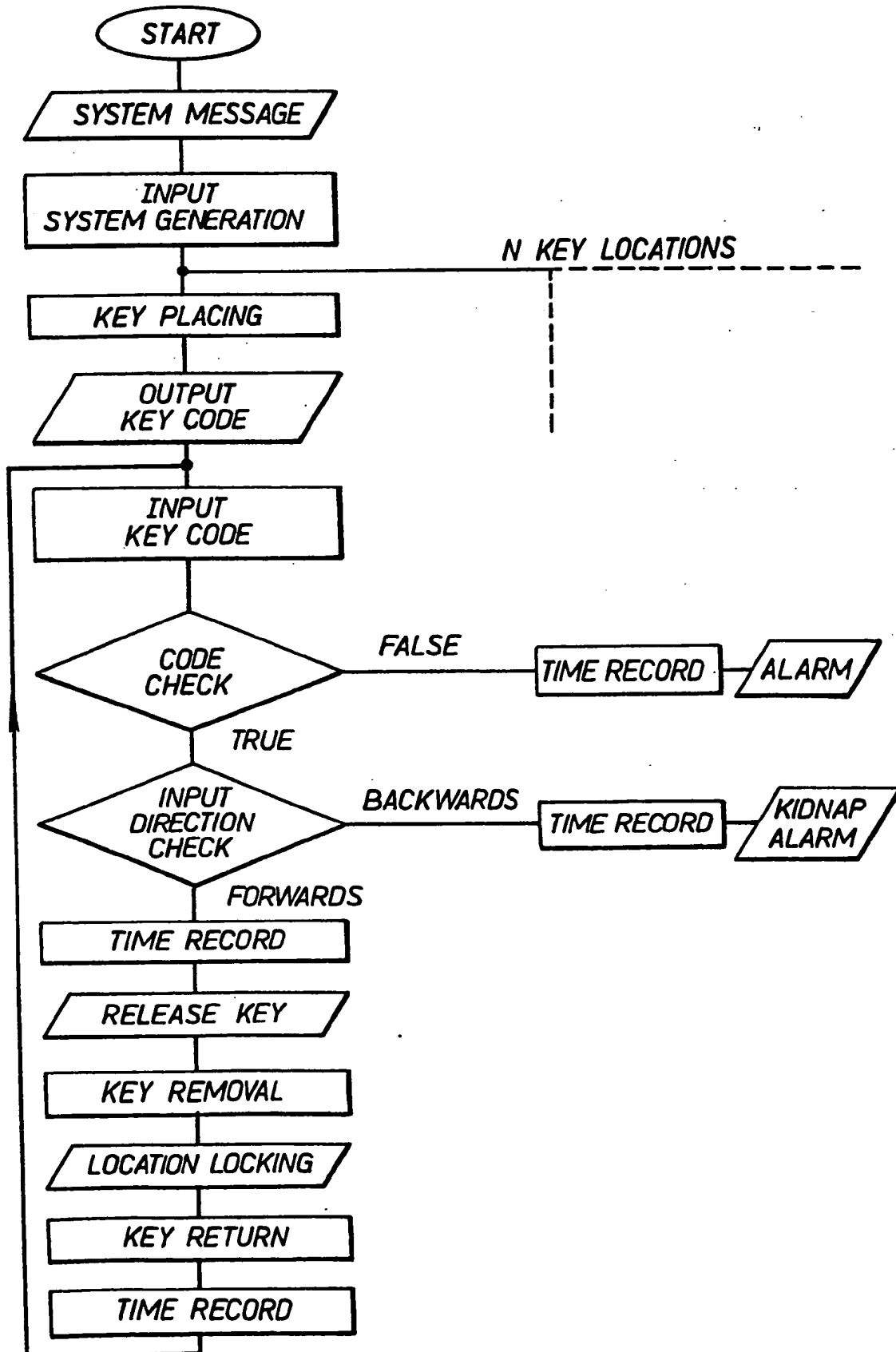
11. A key store as claimed in any preceding  
25 claim, in which the lock is equipped with an electrical

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key monitoring means, the monitoring signal of which is delivered to the code evaluator to output the code signal on the first use and for the control of the code signal comparison.

5                   12.   A key store as claimed in any preceding claim, in which the code evaluation is connected to a recording device for the recording of code inputs, signal output and key actuation.

                  13.   A key store as claimed in any preceding  
10 claim, in which the code evaluator is connected to a random-controlled code generator which produces the code signal when the lock is first used for output through the output device and for storage in the code evaluator.



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